DOCUMENT RESUME

ED 233 685 IR 010 775

AUTHOR Uhlig, George E.
TITLE Computers, Schools, and Society: American Education in an Information Age.
PUB DATE Jan 83
NOTE 12p.; Paper presented at the Annual Meeting of the Alabama Council on Computer Education (Mobile, AL, January 28-29, 1983).
PUB TYPE Viewpoints (120) -- Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computers; *Curriculum Development; Elementary Secondary Education; *Inservice Teacher Education; *Teacher Education; *Technological Advancement; *Technological Literacy
IDENTIFIERS Information Technology

ABSTRACT

The microcomputer is only the very visible tip of a technological iceberg which demands a national technological literacy. Other important new technologies include the laser or optical videodisc and satellite-ground information transfer and telecommunications. National technological literacy requires changes in curriculum development beginning within the teacher education program. Changes have been slow due to a lack of funds, a perceived lack of relevant instructional software on the part of practitioners, resistance to new technology, and a lack of leadership at the local level. The University of South Alabama College of Education, however, has pursued four strategies to equip teachers with understanding and hands-on experience of new technologies, including: (1) the creation of new courses; (2) the incorporation of computer uses into existing methods courses; (3) the development of a program for producing or evaluating instructional computer software; and (4) the introduction of inservice training in computer appplications for local school districts. It is essential that every graduate of American teacher education programs have both the awareness and the technical training to capitalize on new information technologies and that schools find ways to introduce students to the technologies at as early an age as possible. A list of nine suggested readings accompanies this paper. (Author/ESR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED233685

COMPUTERS, SCHOOLS, AND SOCIETY:
AMERICAN EDUCATION IN AN INFORMATION AGE

by

George E. Uhlig

IR010775

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

George E. Uhlig

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Abstract

The author argues that the microcomputer is only the very visible tip of a technological iceberg which is demanding a national technological literacy. In addition to microprocessor-based interactive systems such as the computer, other important technologies include the laser or optical videodisc, satellite-ground information transfer and telecommunications, and the like. This national technological literacy requires curriculum development which begins within the teacher education program. Unless the teachers of today and tomorrow are equipped with an understanding of the various technologies, as well as a "hands-on experience" with them, the teachers will be rapidly made obsolete by the students. It is essential that every graduate of teacher education programs from now on have both the awareness and the technical training to capitalize on the information technologies. It is also essential that schools find ways to introduce the technologies at as early an age as possible. American education as we know it today may not, and probably should not, survive unless it can adapt to and capitalize on these developments.

Computers, Schools, and Society:
American Education in an Information Age

Directions for Curriculum Development

George E. Uhlig, Ed.D.*

There are several important assumptions which underly the remarks I am going to make today. The first is that the microcomputer is simply one element of a set of new technologies which comprise the new information age. Other elements of this set include the laser or optical videodisc, satellite-ground information transfer, and information itself which is experiencing an unprecedented exponential growth curve. The microcomputer is often viewed as the symbol of the silicon revolution because of its wide-spread adoption in businesses, schools, and homes, and because it exemplifies the tremendous reduction in the cost of computing which resulted from large-scale integrated circuit technology, or the "silicon chip" as it is known popularly. While the chip technology was developed in response to the need of the military and government to have light-weight and reliable computers and communications for both defense and outer space exploration, the microcomputer is an outstanding example of "invention being the mother of necessity." The two year old who receives a toy tool kit for Christmas experiences the "hammer phenomena"--everything needs to be hammered. The first

---

NOTE: Paper presented at the 1983 Annual Meeting of the Alabama Council on Computer Education. Mobile, Alabama, 28-29 January 1983.

*Dr. Uhlig is Dean of the College of Education at the University of South Alabama in Mobile.

owners of microcomputers experienced a similar need to computerize everything, even those things which did not lend themselves to computerization.

My second observation is not so much an assumption as it is a prediction. This nation is very likely to take a technological back seat--particularly educationally and socially--to a variety of other countries in the application of these new technologies to education and information dissemination. For example, in Velizy, France--a suburb of Paris--an 18 month experiment is under way in which 2500 homes have been connected via satellite to a variety of information and educational data bases. The French government two years ago committed itself to provide a microcomputer and modem to every home currently served by the telephone company. Among other things, this effort would ensure that what we in the United States know as the white and yellow pages would always be up-to-date (via teletext) and the need for editing, printing and distributing the traditional books would no longer exist.

Incidentally, Edwin Parker and Dean Mack, former professors of communication at Stanford University, have launched Equatorial Communications. They purchased two transponders on the Westar IV satellite. This month Equatorial began beaming streams of digital information back to earth. Using a two-foot-diameter earth station, customers can directly connect their personal computers or terminals through an RS-232 port at data speeds up to 9600 baud. You can buy the earth station for $2500 and set it up indoors in front of a south-facing

window. The developers point out that the amount of information included in the Wall Street Journal can be transmitted for about $550 per month. If this cost is spread over only 1000 subscribers, the per-earth-station cost is 55¢ per month.

At the same time, applications of videodisc technology have expanded dramatically. The Alfred P. Sloan Foundation provided $200,000 in development support to Dartmouth. One application will be to put a complete encyclopedia with dual-track sound and movement onto a total of three videodiscs which can be reproduced for probably a total of $30 a set. A second application is to place twenty years of the out-of-print journal Cell Motility which will then be available to cell biologists, medical students, medical libraries, physicians, and the public for some price, probably in the neighborhood of $29.95.

Most people agree that these advances in technology are going to have a tremendous impact on our society. William Stockton, writing in the New York Times Magazine on June 29, 1981, predicted:

"The computer, the most visible example of modern technology, will proliferate beyond most people's imaginings. Computers will become small and faster, and appear in virtually every machine humans use. The revolution in information processing, already well underway, will accelerate. Computers will undoubtedly become central to almost every (medium) of communication; even recorded human speech will be computerized, analyzed, cataloged, translated into foreign languages, stored, and retrieved as needed."

What all this means for the schools of the future is a question which occupies the time of many educators. In an editorial to T.H.E. Journal in 1980, L. M. Stolurow summarized one of the problems:

"Educators want technology to improve the education of teachers and children. . . However, college professors of education and of the liberal arts, those who are training the new teachers, have not yet moved into the field in large numbers."

Subsequent survey research conducted by a variety of individuals and groups have documented that the movement toward training teachers in the use of applicable technology has been slow in most areas. The reasons for this slowness seem to be nested in five areas: the lack of funds at the elementary/secondary level to purchase microcomputers in sufficient numbers to make instruction general across the curriculum; the lack of funds and trained faculty to change substantially the manner in which pre-service and in-service teacher training is provided by Colleges, Schools, and Departments of Education; the perceived lack of relevant instructional software on the part of practicioners; resistance on the part of practicioners to embrace a technology which they perceive might make their own career superfluous; and the lack of leadership at the local level (both K-12 and IHE) to move the profession toward the technology.

About five years ago we started, at the USA College of Education, to take the silicon revolution seriously, and began a systematic effort at faculty and staff development. Without going into great detail about the effort, it is refreshing to find Podemski in a 1981 issue of the Journal of Teacher Education articulating four strategies we had been pursuing for several years:

"1. The creation of (undergraduate and graduate, as well as special courses) on the use of microcomputers in education.

2. Incorporating computer uses into existing methods courses.

3. The development of instructional computer software and of research regarding the instructional potential and limitations of computer utilization.

4. Providing in-service on computer applications for local school districts." (Vol. XXXll, #1, Jan.-Feb., 1981, pp. 29-33.)

It may be instructive to look at our experience with these four strategies. The creation of new courses was probably the easiest of the four strategies to accomplish, but we are in a continuous state of evaluation and refinement. The fourth strategy also started relatively early. Particularly did we provide in-service to other Colleges/Schools/Departments of Education. As a result of discussions and a planning effort with the four Mobile County Area Superintendents, and with the Office of Staff Development, within a few weeks we will be offering a series of non-credit awareness workshops for teachers from the Mobile County Public Schools.

Rather than expect our faculty to "develop" instructional software and courseware, we took the evaluation route. Fifteen members of our faculty, plus one from the Department of Computer Science and several from the Mobile County Public Schools, completed two intensive days of training by Educational Products Information Exchange on software analysis. One result is that we will be named as a satellite evaluation center for EPIE and will have the opportunity to evaluate instructional software/courseware on a reguiar basis.

Incorporating computer uses into existing methods courses has been the most difficult to achieve. Such an effort requires both trained,

interested, and/or experienced faculty and the availability of hardware/ software to assign to individuals, or to individual departments for extensive periods of time. Most of our hardware and software have been devoted to the instructional laboratories or to the demonstration and in-service activities of the College. If we are to achieve this last goal, it is going to be essential that we have sufficient hardware and a flexible policy of assignment for that hardware.

As you can probably surmise from my remarks, it is my view that a national technological literacy requires curriculum development which begins within the teacher education program. Unless the teachers of today and tomorrow are equipped with an understanding of the various technologies, as well as a "hands-on experience" with them they are going to be rapidly made obsolete by the student. The business education teacher who has no knowledge of word processing or telecommunications, the science teacher who has never "simulated" an experiment on a computer, the mathematics teacher who rapidly tires of "drill and practice activities," the librarian who has no readily accessible knowledge of where the books are or who has checked out which, are all going to find themselves second-class citizens, not only to their colleagues in other professions, but to the ranks of students who are being weaned on tne home computer. It is essential that every graduate of teacher education programs from now on have both the awareness and the training to capitalize on the information technologies. I am not certain what comprises "computer literacy" for an elementary or secondary school teacher who is

going to utilize the hardware and software to enrich and enhance instruction in the classroom. It is clearer to me what the teacher of high school computer science or computer literacy needs to know. I am satisfied that you do not have to be an automotive engineer to teach driver education or an aeronautical engineer to teach flying. Conversely, because one can fly does not make one an aeronautical engineer.

It is also essential that the schools introduce the technologies at as early an age as possible. According to the National Center for Educational Statistics, Alabama spends on the average $120 per student in transportation. For less than that amount, each student could be provided with, minimally, a Timex/Sinclair Z-81 microcomputer. The President of the San Diego Computer Society wrote in an editorial in December 1982: "Let's get computers into the classrooms ASAP-Kindergarten to Grad school. It doesn't matter what make or model; be it even Timex 1000's at $99.95." I think he is correct. I have talked with people who are contemplating purchasing a microcomputer who give more thought to the exact model and peripherals than they gave to purchasing their first or last car, or possibly even to selecting a spouse!

In conclusion, we are living in a fascinating age. Whether American education, as we know it, will survive the technological revolution and information explosion is a question which cannot be answered today. It seems clear to me that it will not, and probably should not survive, unless it can adapt to and capitalize on these developments.

References

Podemski, J., Computer Technology and Teacher Education. Journal of Teacher Education, Vol. XXXII, #1, Jan-Feb., 1981, pp. 29-33.

Stockton, William, The Technology Race. New York Times Magazine, June 29, 1981, pp. 14-18, 54-55.

Stolurow, L. M., Editorial. T.H.E. Journal, Vol. 7, #2, 1980, p. 2.

Uhlig, G. E., Electronic Education: Dimensions and Directions. Education, Vol. 103, #2, Winter, 1982, pp. 106-11.

Uhlig, G. E., Technological Futures in Education. In Mahan, H. F. and Newman, J. W. (Eds.) The Future of Public Education in Mobile, Mobile. The South Alabama Review, 1982, pp. 69-78.

Wakely, W., President's Remark. Personal Systems, December 1982, p. 5.

SUGGESTED READING

Caldwell, Robert M., "Guidelines for Developing Basic Skills Instructional Materials for Use with Microcomputer Technology," Educational Technology, V20, N10, P7-12, October 1980.

DeLaurentiis, Emiliano, "Learning by Interactive Programming: Microcomputer Applications," Educational Technology, V20, N12, P10-14, December 1980.

DeLuca, Frederick P.; Scouten, Donald C., "A Microcomputer System as a Tool for Research in Logical Thinking," Journal of Educational Technology Systems, V9, N1, P3-20 1980-81.

Dickerson, Laurel; Pritchard, William H., Jr., "Microcomputers and Education: Planning for the Coming Revolution in the Classroom," Educational Technology, V21, N1, P7-12, January 1981.

Licklider, Tracy R., "Calling Information: Telecomputing with Personal Computers," Creative Computing V7, N4, P78-84, April 1981.

Melmed, Arthur S., "Information Technology for Education: An Agenda for the 80's." Technological Horizons in Education, V7, N6, P46-47, 62, November 1980.

Molnar, Andrew R., "Microcomputers and Videodisc: Innovations of the Second Kind," Technological Horizons in Education, V7, N6, P58-62, November 1980.

Morgan, Chris, "The Lawrence Hall of Science: Teaching Personal Computing in the Hills of Berkeley," Oncomputing, V2, N2, P13-19, Fall 1980.

Nelson, Harold; Friedman, Rich, "Seymour Papert. Spearheading the Computer Revolution," Oncomputing, V2, N1, P10-12, Summer 1981.